Assessing the Relationship between Skills Acquisition and Application on the Job by Pioneer Graduates of Building and Construction Department, Umutara Polytechnic, Rwanda

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Authors' contributions

This work was carried out in collaboration between authors CKK, FU and DMR. Author CKK designed the study, performed the statistical analysis, did literature searches, and two drafts. Author FC collected data using second questionnaire. Author DMR did literature searches and proof reading. All three authors read and approved the final manuscript.

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ABSTRACT

University education is important as it equips an individual with skills that are necessary to perform certain tasks once employed or self employed, consequently, contributing to the realization of visions in developing countries like Rwanda. Information from graduates of a particular program is vital in informing decision makers on necessary changes in curriculum for improved skills delivery. The aim of the study was to ascertain the skills graduates were using in performing construction related jobs by the end of six months after graduation with the following as specific objectives: To identify which skill they acquired at the University; to identify which skill was useful to them in the first job they got. The study involved administering questionnaires to pioneer graduates in Building and Construction Technology of Umutara Polytechnic just after finishing studies and six months after graduation. The results showed that courses enjoyed were significantly correlated (α=0.01) with the courses

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where many things were learnt and related to skills thought to be useful after graduation at α=0.10. There was no significant relationship between courses where more things were learnt and the skills thought would be useful after graduation. Design was ranked top on all the issues. Further research on the courses graduates are using in their work place one year after graduation is recommended.

1. INTRODUCTION

Education is important for any country because it equips the society with the knowledge, skills and values that enable a country attain its vision [1]. The developed countries like US, Britain, Germany and others developed economically because they invested heavily on education resulting in high literacy rates that equipped the nation with the tools of development [2]. In Rwanda, education is one of the key pillars of Rwanda vision 2020. Education imparts skills and hence results in continuous production of human resource needed to fill vacancies in both public and private institutions.

The government of Rwanda restarted education sector in 1998 after the 1994 genocide which made the shortage of technicians to be worse. The starting of new institutions of higher learning was seen as way of restarting the education sector [3]. There are 17 institutions of higher learning in Rwanda with Umutara Polytechnic (UP) as one of them [4]. UP started in 2006 as a private polytechnic and on 19/10/2009 it was made a public University by Government Gazette number 42 regarding Higher Institutions of learning with vocational training as one of the ingredients of its vision. In 2010, UP enrolled 2954 students of which 133 were admitted to study Building and Construction Technology.

The program was started with the objective of training students who would contribute to Rwanda Vision 2020 in terms of contributing to the realization of comprehensive human resource development [5]. Out of the total number of 133 students admitted, 129 graduated having completed their studies on 24th July, 2013 giving a completion rate of 97%. It took the students 3.4 years to complete studies which was close to 3.1 years observed in a New Zealand Polytechnic for white students [6].

The starting of the Department of Building Construction was timely as it is supposed to produce graduates who would fill the vacancies in the country. A survey on vacancies and skills was done in 2010. The vacancies in the fields of science, engineering and technology accounted for 25.3% of the vacancies advertised [6]. In addition, the National Council for Higher Education undertook a national skills survey through the use of questionnaires with a response rate of 85.2%. It was found that 66% of employees in Rwanda were between the ages of 25-40 years and many people were recruited at the age of 25-30 years [7].

Research on undergraduates can cover many fields like internet attitude [8], employment [9, 10], performance of students in a particular module e.g. final year project [11], student teachers' computer attitudes [12] or even student pathways in a given University [6]. This current study looked at the skills acquired at University and the skills used by the pioneer graduates of Building and Construction Technology after graduating from UP.

These pioneer graduates are unique because they were the only graduates of UP before being made one of the campuses of University of Rwanda (UR). As the students graduated there was need to know their training at the University as well as skills used on site after employment six months after graduation. A period of six months was used because it is normally the probation period for new employees in the Umutara Polytechnic. In addition, a similar study in Botswana found that 68.1% of graduates in construction industry got jobs in less than 6 months [10].

The students exited on level 5 after accumulating 480 credits in a period of 4 academic calendar years [13] to earn a bachelors degree with honours in Building and Construction Technology of UP. In the process of accumulating the credits, they studied 50 modules with some modules in water, architectural design and drawing, design, workshop technology and practice, Geographic Information Systems (GIS), structures, traffic engineering, highway engineering, entrepreneurship, quantity surveying, law, two-month industrial training among others. This resulted in acquisition of different skills.

There is little information, if any, on skills acquired and skills needed by graduates of Umutara Polytechnic to perform their jobs in building and construction. The aim of the study was to ascertain the skills graduates were using in performing construction related jobs by the end of six months after graduation on 30th August, 2013. The study had the following as specific objectives:

To identify the skills acquired by the graduate of Building and Construction Technology at the University.

To identify the useful skills needed in the first job they got.

2. RESEARCH METHODS

The study used the employability model as the conceptual benchmark [14] as shown in Fig.1 The study used quantitative techniques. Quantitative design approach is focused on collection and analysis of numerical data and hence scientific method [15].

The research instrument used was questionnaire. It was administered to the pioneer graduates in the Department of Building and Construction Technology of UP in Rwanda. There were two set of questionnaires, the first contained 9 items which investigated the respondent's characteristics such as: sex, age, marital status, liking of the program, modules enjoyed, modules where many things were learnt and the skill they thought would be useful for them once they graduate. The first questionnaire was distributed to students as they defended their final year project. The second questionnaire which was administered six months after graduation contained one item on skills needed at work.

The statistical tool used was percentage and was done using Excel spreadsheet with the results being presented in tables. Excel spreadsheet was used to analyse data for determining the Spearman rank correlation coefficient [16] between courses enjoyed, courses where many things were learnt, and skills thought to be useful after graduation at level of significance of $\alpha=0.01$.
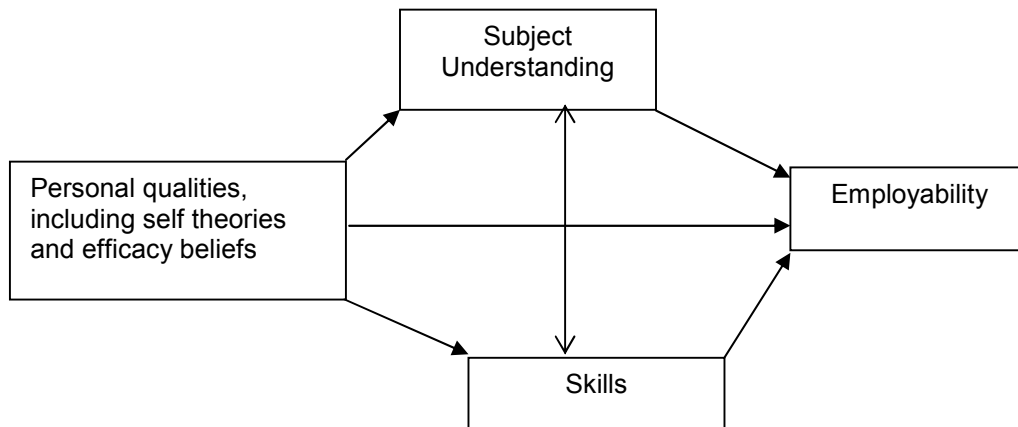
Fig. 1. A schematic model of employability [14]

3. RESULTS AND DISCUSSION

Out of 129 copies of questionnaire administered to students immediately after finishing school, only 96 copies were retrieved representing a response rate of 74%. All the copies retrieved were used for analysis.

The female students who filled the questionnaires were 31(78%) and male 65 (73%) showing that female students filled and returned questionnaires better than male students. The age of the final students are as shown in Table 1.

From Table 1, the respondent above 30 years was a male. He enjoyed water resources and thought entrepreneurship would assist him after graduation. He learnt many things in architectural drawing and design. There were more married female respondents who enjoyed and learnt many things in design than single female respondents. However, more single female respondents thought design would be useful after graduation. In addition, six single female respondents thought that workshop technology and practice would be useful after graduation. No respondent enjoyed the following courses: workshop technology and practice, GIS, and entrepreneurship. Further, no respondent learnt fewer things in the following courses: concrete technology, entrepreneurship and workshop technology and practice. No respondent thought traffic engineering, public health engineering, concrete technology, highway engineering and hydraulic design would be useful after graduation. In Table 1, 52% of the male respondents were above 26 years old while 26 % of the female respondents were above the age of 26 years. This showed that female students were younger than their male counterparts. The above respondents were below five years when the genocide of 1994 occurred and the mean age of less than 25 years is the same for other developing countries like Malaysia for students finishing their first degree [12].

Six months after graduation, messages were sent to the respondents requesting the skills being used in their respective place of work. Out of 129 respondents, 43 responded.

Table 2 contains the data obtained from the two questionnaires. Columns 2, 3 and 4 are from the first questionnaire while column 5 is results from the second questionnaire. Table 2 shows that design topped the courses which many students enjoyed (29.2%), students learnt many things (18%), a course where students thought would be useful after studies

(34.2%) and the course used by graduates at work place (27.6%). Also in Table 2, 27.6% of graduates indicated of applying quantity surveying in the work place as well as design. Workshop Technology and Practice became the third course which imparted much of the skills being used on site.

Table 1. Ages, marital status and numbers of students by gender of pioneer class

Course name	% of students who enjoyed the course			% of students who learnt more things in the course			% of students who thought the course would assist them at work place		
	Age in years			Age in years			Age in years		
	20-25	26-30	>30	20-25	26-30	>30	20-25	26-30	>30
Design	$17^m,1^{sf}$	$8^m,2^{mf}$	0	$4^m,3^{sf}$	$5^m,1^{sf},3^{mf}$	0	$11^m,3^{sf}$	$9^m,2^{mf}$	0
Analysis of structures	$3^m,4^{sf}$	$5^m,2^{mf}$	0	$8^m,1^{sf}$	$3^m,2^{mf}$	0	0	$1^m,1^{mf}$	0
Quantity surveying	$2^m,2^{sf}$	$4^m,2^{mf}$		1^m	3^m	0	$1^m,2^{sf}$	1^{mf}	0
Public health engineering	$1^m,5^{sf}$	1^m	0	$1^m,1^{sf}$	4^m	0	0	0	0
Water resources	$1^m,1^{sf},1^{mf}$	3^m	1^m	$1^m,1^{sf}$	3^m	0	$1^m,2^{sf}$	$2^m,1^{mf}$	0
Traffic engineering	$1^m,1^{sf}$	3^m	0	2^m	1^m	0	0	0	0
Highway engineering	3^{sf}	0	0	$1^m,4^{sf}$	$1^m,1^{mf}$	0	0	0	0
Concrete technology	2^{sf}	1^m	0	0	0	0	0	0	0
Hydraulic design	0	2^m	0	3^m	$1^m,1^{mf}$	0	0	0	0
Architectural design and drawing	1^m	$1^m,1^{sf}$	0	$1^m,3^{sf}$	$2^m,1^{mf}$	1^m	$12^m,2^{sf}$	$5^m,2^{mf}$	0
Soil mechanics	2^m	0	0	1^m	$2^m,1^{sf}$	0	1^{sf}	0	0
Workshop Technology and Practice	0	0	0	0	0	0	6^{sf}	1^m	0
Entrepreneurship	0	0	0	0	0	0	0	1^m	1^m
GIS	0	0	0	0	1^m	0	2^{sf}	0	0
Others	$3^m,3^{sf},1^{mf}$	5^m	0	$4^m,3^{sf}$	$3^m,2^{sf}$	0	1^m	2^m	0
Total respondents	55	40	1	43	39	1	44	28	1

Key: m-male respondents, sf- single female respondents, and mf- married female respondents

Analysis of structures was the second most enjoyed and the second course in which students learnt many things. However, analysis of structures was displaced by architectural design and drawing in the case of skills thought as the skill that would assist them when

doing their job. In architectural design and drawing, students learnt few things and did not enjoy architectural design and drawing but they know it is important skill for life after school.

Table 2. Percentages of courses students enjoyed, learnt more things, courses thought would be useful and those used at work place

Course name	% of students who enjoyed the course	% of students who learnt more things in the course	% of students who thought the course would assist them at work place	% of students applying the learnt course at work
Design	29.2	18.0	34.2	27.6
Analysis of structures	14.6	16.9	2.7	0.0
Quantity surveying	10.4	4.8	5.5	27.6
Public health engineering	7.3	7.2	0.0	0.0
Water resources	7.3	6.2	8.2	0.0
Traffic engineering	5.2	3.6	0.0	0.0
Highway engineering	3.0	8.4	0.0	3.5
Concrete technology	3.0	0.0	0.0	0.0
Hydraulic design	2.1	6.2	0.0	0.0
Architectural design and drawing	2.1	4.8	28.8	3.5
Soil mechanics	0.0	4.8	1.3	0.0
Workshop Technology and Practice	0.0	0.0	9.6	17.3
Entrepreneurship	0.0	0.0	2.7	0.0
GIS	0.0	1.2	2.7	3.5
Others	15.8	17.9	4.3	17.0
Total	100.0	100.0	100.0	100.0

Table 3. Correlation coefficients (Spearman rank correlation coefficient, r_s) among courses enjoyed, courses where many things were learnt and courses thought would be useful by pioneer Building and Construction technology students of Umutara Polytechnic 2013

	% of students who Enjoyed the course	% students who said that they learnt many things in the courses	% of students who thought the course will be necessary for work
% of students who Enjoyed the course	X	0.80[*]	0.46[**]
% students who said that they learnt many things in the courses	0.80[*]	X	0.36 (ns)
% of students who thought the course will be necessary for work	0.46[**]	0.36 (ns)	X

*Key: * significant at α=0.01, ** significant at α = 0.1 and ns is not significant*

Table 3 showed that courses enjoyed was significantly correlated (α = 0.01) with the courses where they learnt many things. This shows that students enjoyed courses in which they

learnt many things. Therefore, lecturers can make their students enjoy their courses by giving them a lot of relevant information applicable on the field. Courses enjoyed was significantly correlated (α= 0.10) to the skills necessary for work which means that students enjoyed a course which they thought would be of value to them once they graduate. Therefore, lecturers can make their students enjoy by using practical experience from the field. Courses in which they learnt many things were not correlated with the skills students thought would be useful when they graduate. This means that students were given more work which, according to them, was not going to be useful to them in the job market.

4. CONCLUSION AND RECOMMENDATION

The study has shown that pioneer students are applying structural design and detailing and quantity surveying in their work place. In addition, the study showed that there is a significant correlation (at α=0.01) between the enjoyment of a course being taught at the University with the courses where many things are learnt (r_s=0.80) and when the course is thought to be useful after graduation (r_s=0.46) at α=0.10. The Department should maintain and improve design while trying to upgrade the other courses. There is need for further research on the courses graduates are using in their work place one year after graduation.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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